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Plasmon drag effect in profile-modulated surfaces with periodic and random modulation. NATALIA NOGINOVA, Norfolk State University, MATTHEW LEPAIN, Georgia Southern University, VINCENT RONO, SOHEILA MASHHADI, Norfolk State University, MAXIM DURACH, Georgia Southern University — Photoinduced currents associated with plasmon excitation and propagation (plasmon drag effect) are theoretically and experimentally studied in flat, rough and profile modulated metal films. We demonstrate great enhancement of the effect in rough and nanostructured surfaces and possibility to control the amplitude and polarity of photoinduced electric signals with surface geometry and illumination conditions. We discuss the modified electromagnetic momentum loss approach which can correctly describe the photoinduced voltages associated with propagating surface plasmon polaritons. Direct proportionality of energy and momentum transfer in interactions of plasmons and free electrons in metal is predicted and proven to be valid for surfaces with relatively low height modulation amplitudes. We also suggest an equivalent circuit model, which can provide qualitative description of the plasmon-induced electrical effects in modulated surfaces and surfaces with random roughness.

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